

Chapter 2. Hydrologic Conditions

The January 1997 through December 2000 period covered by this report includes the last nine months (January through September) of water year 1997; all of water years 1998, 1999, and 2000; and the first three months (October through December) of water year 2001. Because hydrologic conditions are typically discussed using water years, this chapter will discuss water years 1997 through 2000 (October 1997 through September 2000) unless otherwise noted.

Water years are classified using the Sacramento Valley 40-30-30 Water Year Hydrological Classification Index^{1,2} (the Sacramento Valley Index) and the San Joaquin Valley 60-20-20 Water Year Hydrological Classification Index^{3,4} (the San Joaquin Valley Index) (SWRCB 1999). The Sacramento Valley Index is used to characterize water years statewide because the predominance of precipitation falls within the northern half of the state and much of that precipitation flows down the Sacramento River through the upper San Francisco Estuary. The index is also used because the Sacramento River watershed provides the majority of water to the State Water Project and to the Central Valley Project (SWRCB 1999). Using this index⁵, water years 1997 through 1999 were classified as wet and water year 2000 was classified as above normal. Although the San Joaquin Valley Index is used predominantly for regional applications, it provides supporting information concerning water conditions within the San Joaquin Valley. Using the San Joaquin Valley Index⁶, water years 1997 and 1998 were classified as wet and water years 1999 and 2000 were classified as above normal. Figure 2-1 summarizes these findings.

Precipitation, runoff, reservoir storage, and snowpack water content were all above normal for all four water years. Statewide figures for May 1 are summarized in Table 2-1.

Due to the above-normal precipitation, runoff, reservoir storage and snowpack water content, unimpaired runoff for all water years was high (CDEC 2002). Table 2-2 summarizes these conditions and Figure 2-2 demonstrates this relatively high-flow period compared with the low-flow period of 1987-1994.

¹ The Sacramento Valley 40-30-30 Water Year Hydrological Classification Index is equal to $0.4 \times \text{current April to July unimpaired runoff} + 0.3 \times \text{current October to March unimpaired runoff} + 0.3 \times \text{previous year's index}$ (if the previous year's index exceeds 10.0, then 10.0 is used).

² Sacramento River unimpaired runoff is the sum of Sacramento River flow at Bend bridge, Feather River flow to Lake Oroville, Yuba River flow at Smartville, and American River flow to Folsom Lake (SWRCB, 1999).

³ The San Joaquin Valley 60-20-20 Water Year Hydrological Classification Index is equal to $0.6 \times \text{current April to July unimpaired runoff} + 0.2 \times \text{current October to March unimpaired runoff} + 0.2 \times \text{previous year's index}$ (if the previous year's index exceeds 4.5, then 4.5 is used).

⁴ San Joaquin River unimpaired runoff is the sum of Stanislaus River inflow to New Melones Lake, Tuolumne River inflow to New Don Pedro Reservoir, Merced River inflow to Lake McClure, and San Joaquin River inflow to Millerton Lake.

⁵ Using the Sacramento Valley Index, water years are defined as follows: (1) a "Wet" year occurs when the Index is equal to or greater than 9.2; (2) an "Above Normal" year occurs when the Index greater than 7.8 but less than 9.2; (3) a "Below Normal" year occurs when the Index is greater than 6.5 but equal to or less than 7.8; (4) a "Dry" year occurs when the Index is greater than 5.4 but equal to or less than 6.5; and, (5) a "Critical" year occurs when the Index is equal to or less than 5.0 (SWRCB, 1999)

⁶ Using the San Joaquin Valley Index, water years are defined as follows: (1) a "Wet" year occurs when the Index is equal to or greater than 3.8; (2) an "Above Normal" year occurs when the Index greater than 3.1 but less than 3.8; (3) a "Below Normal" year occurs when the Index is greater than 2.5 but equal to or less than 3.1; (4) a "Dry" year occurs when the Index is greater than 2.1 but equal to or less than 2.5; and, (5) a "Critical" year occurs when the Index is equal to or less than 2.1 (SWRCB, 1999)

Water Quality Conditions in the Sacramento-San Joaquin Delta and Suisun and San Pablo Bays from 1997 Through 2000

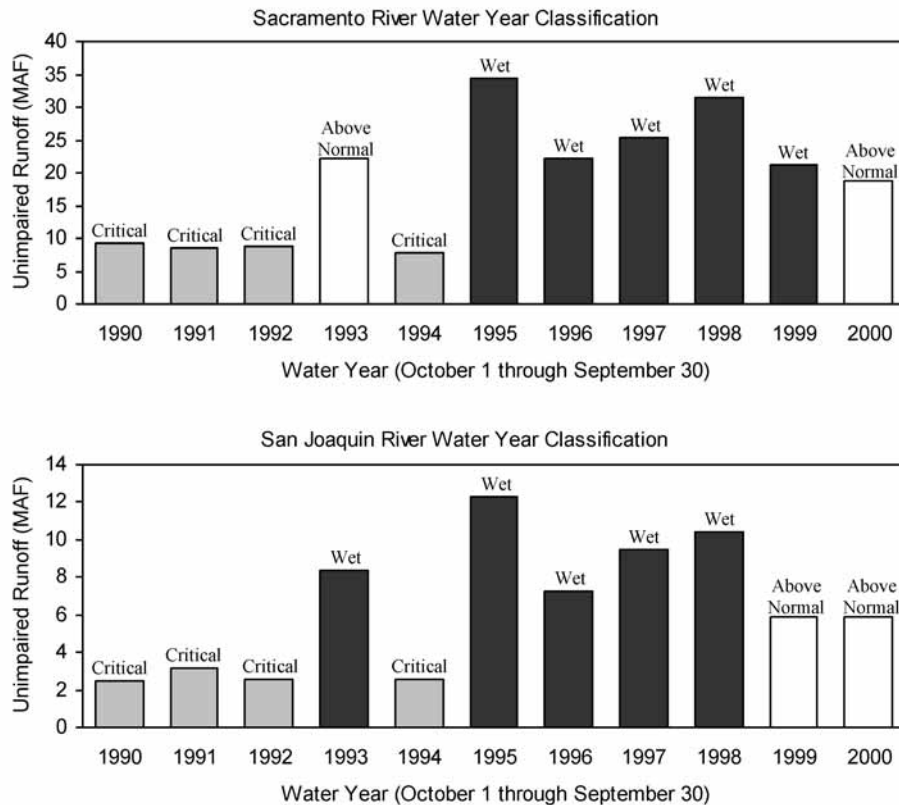


Figure 2-1 Sacramento River Hydrologic Region 40-30-30 and the San Joaquin River Hydrologic Region 60-20-20 Indices from 1990 through 2000.

Table 2-1 Summary of the major hydrologic characteristics of water years 1997 through 2000

Water Year	Precipitation (% of normal)	Seasonal Runoff (% of normal)	Reservoir Storage (% of normal)	Snow Water Content (% of normal)
1997	120	175	110	55
1998	160	155	115	190
1999	100	115	115	120
2000	95	100	115	75

Table 2-2 Average runoff for water years 1997, 1998, 1999, and 2000.

Sacramento River			
	Oct 1st-	Apr 1st-	Whole
Year	Mar 30th (MAF)	Jul 30th (MAF)	Year (MAF)
1997	20.23	4.39	25.42
1998	17.65	12.54	31.39
1999	12.97	7.26	21.19
2000	12.01	5.99	18.88

San Joaquin River			
	Oct 1st-	Apr 1st-	Whole
Year	Mar 30th (MAF)	Jul 30th (MAF)	Year (MAF)
1997	5.75	3.59	9.51
1998	2.83	7.11	10.43
1999	1.9	3.85	5.91
2000	1.98	3.78	5.9

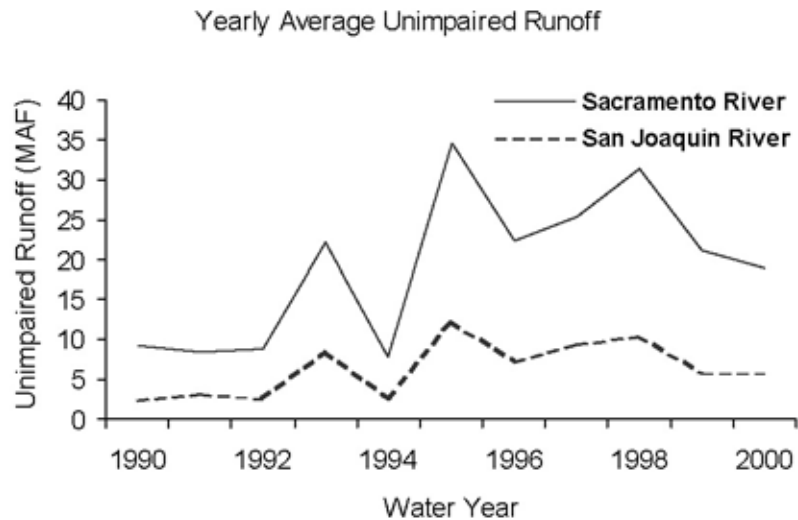


Figure 2-2 Unimpaired runoff for the Sacramento and San Joaquin Rivers for water years 1990 through 2000.

Water year 1998 had the highest unimpaired runoff of the study period, with a value exceeding 31 million-acre feet in the Sacramento Valley River Basin and 10 million-acre feet in the San Joaquin Valley River Basin.

The Net Delta Outflow Index⁷ (Figure 2-3) is used to determine the freshwater outflow from the estuary. Much of the water that flows through the estuary does so during the late winter and early spring months. Water year 1997 had the widest range of flows during the study period, with maximum Delta outflow indices exceeding 17 million acre-feet in January and minimum outflow indices approaching 200,000 acre-feet in September.

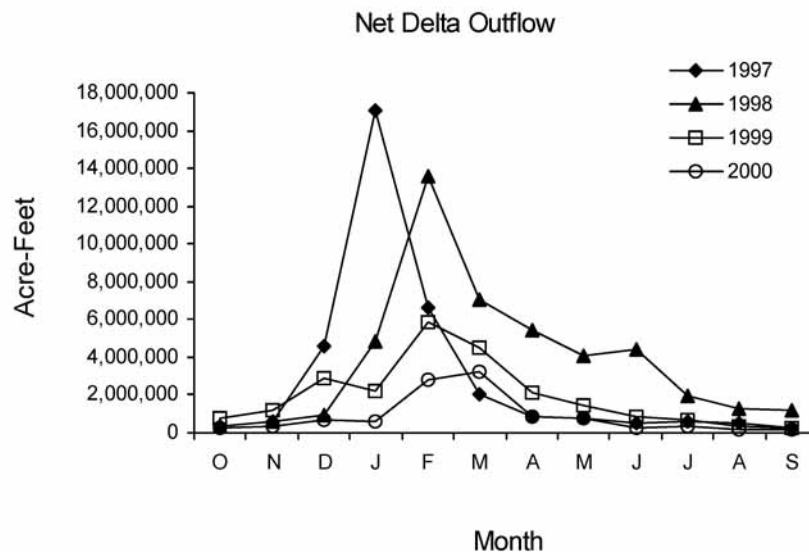


Figure 2-3 Net Delta Outflow Indices 1997 through 2000.

⁷ The Net Delta Outflow Index is a calculation of freshwater outflow from the Delta past Chipps Island. The NDOI includes a factor dependent upon inflows of the Yolo Bypass System, the eastside stream system (the Mokelumne, Consumnes, and Calaveras Rivers), the San Joaquin River at Vernalis, the Sacramento Regional Treatment Plant, and miscellaneous Delta inflows (Bear Creek, Dry Creek, Stockton Diverting Canal, French Camp Slough, Marsh Creek, and Morrison Creek).

